

Identification key to and checklist of the Swedish Phlaeothripidae (Thysanoptera)

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Abstract

The Swedish fauna of thrips (Thysanoptera) in the family Phlaeothripidae consists of 49 species. A key to the species of Phlaeothripidae found in Sweden is provided. One species is recorded as new for the country, and 10 new regional records are presented. A checklist of all Swedish tubuliferan species with regional distributions is also given.

Keywords

Distribution, first record, identification, morphology, taxonomy, Thrips, Tubulifera

Introduction

Thysanoptera Haliday, 1836, more commonly known as thrips, are minute insects which are often not longer than 3 mm; larger species may reach 5 mm in size. Thrips have caught attention not only from researchers but also from the commercial and private sector, due to their impact as pests in agriculture (Paine 1992) and even as invasive species (Held et al. 2005; Boyd and Held 2006). The group least studied in Sweden is the family Phlaeothripidae Uzel, 1895. Some species are found in flowers, e.g., in the genus *Haplothrips* Amyot & Serville, 1843 (Fig. 1), but most of the known species in Sweden are found in soil, leaf litter, and decaying wood.

The research regarding Palaearctic taxa is scarce. Only a few regional checklists have been published in recent years, and the most relevant identification keys focus

on the species in Great Britain (Mound et al. 1976, 2018; Kirk 1996). In recent years the fauna of Poland, a region with a previously similarly understudied thrips fauna, has been studied more extensively, which has led to a large gain in both taxonomic and ecological knowledge (Kucharczyk and Zawirska 1994; Kąkol and Kucharczyk 2004; Kucharczyk 2004; Kucharczyk and Kucharczyk 2008; Dubovský et al. 2010; Kucharczyk and Wyrozumski 2015). Most of the knowledge of Swedish taxa is based on older identification literature, e.g., Ahlberg (1926), Mound et al. (1976), and Kirk (1996), often not specific for Scandinavian conditions. A few papers have been published reporting new species at irregular intervals, reporting sporadic observations (Qwick 1977; Vasiliu-Oromulu et al. 2000; Kobro 2011; Sörensson 2012; Gertsson 2015a; Gertsson and Fägerström 2017). Kobro and Rafoss (2006) produced a key to the genus *Haplothrips* in Norway, and Kobro (2013) produced an identification key to Norwegian thrips in general but only covered the most common and for amateurs easily distinguished species. The overlaps of the distributions the of Swedish and Norwegian species is currently not known, and no identification key to the Swedish fauna exists. Gertsson (2015b) provided a checklist of Nordic thrips. However, this was based only on previously collected specimens in museum collections. Recently new records to the fauna were made from freshly collected material, with a total of 5 new species for Sweden and several new regional records (Gertsson and Fägerström 2017; Gertsson 2021; Gertsson et al. 2022). In this paper we update the Swedish checklist of the family Phlaeothripidae and provide an identification key to the species with photographic illustrations.

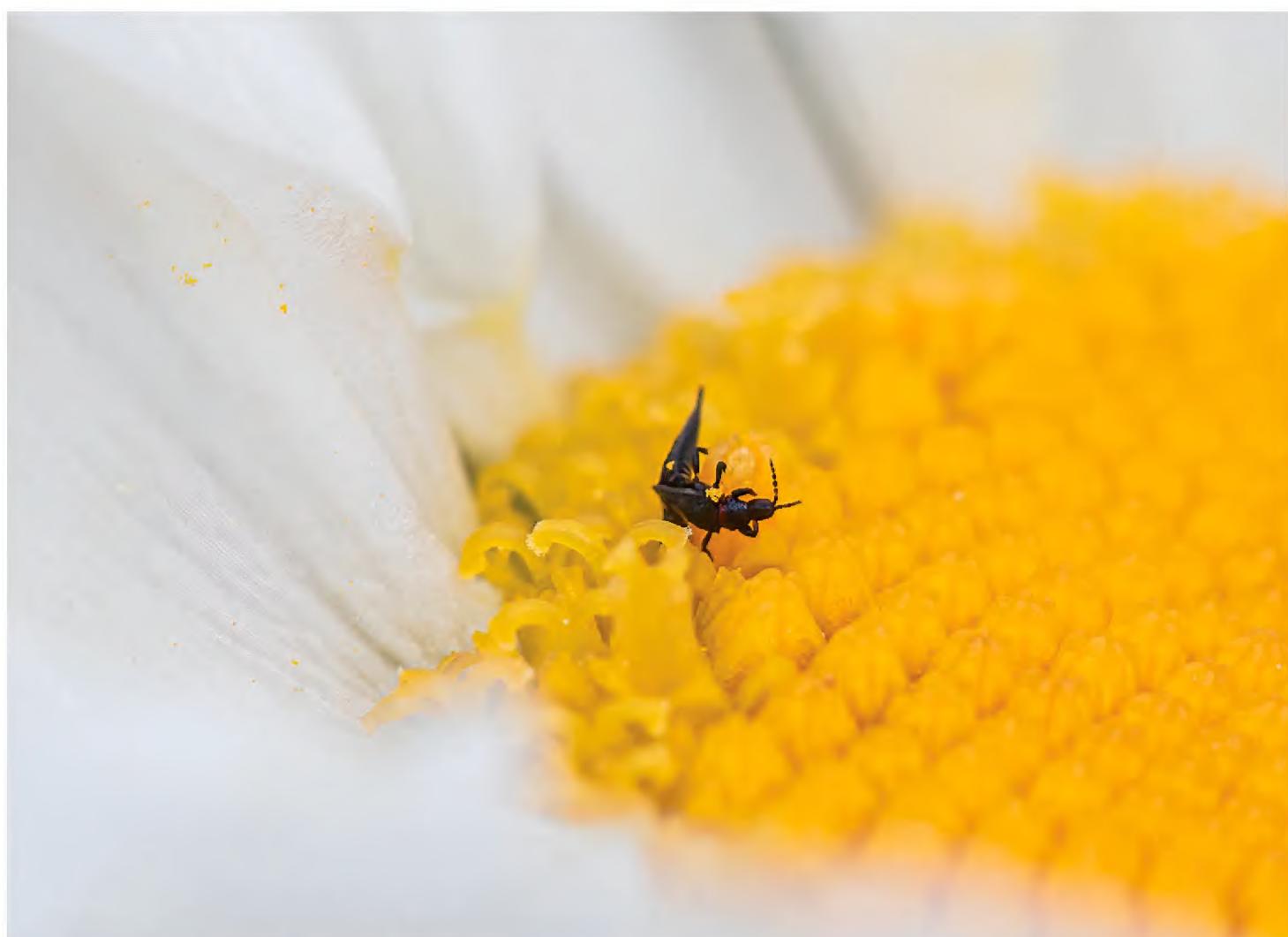


Figure 1. *Haplothrips leucanthemi* in flower of *Leucanthemum vulgare*.

Material and methods

For this study we have examined representative specimens from the collections of The Swedish Museum of Natural History, Sweden (**NHRS**), Lund Museum of Zoology (**MZLU**), Sweden, Forschungsinstitut und Naturmuseum Senckenberg (**SMF**), Germany, and the private collections of Sverre Kobro and Manfred R. Ulitzka. In addition, newly collected material has been used, prepared on slides with Euparal according to the method outlined in Kobro (2013). The exception to this method is the preservation prior to maceration and the maceration step, where in this study fresh material has been stored in 80% ethanol prior to DNA extraction. Maceration has thereafter been carried out during DNA extraction before preparation on microscopic slides. This method has successfully been used for one-step DNA extraction and maceration for small insect specimens (Wahlberg and Johanson 2018; Wahlberg 2019). DNA extract is stored at the NHRS for further studies. The material was examined and photographed using manual focus stacking on Nikon Eclipse 80i and Swift 380T microscopes, with Nikon DS-Fi1 and Swift SC1003 cameras. Photos were automatically aligned and stacked using Helicon Focus 8.0.4 and Swift Imaging 3.0, and edited and finalized in Adobe Photoshop CC 23.2.0. The distributional data are provided on county level. The material collected and preserved during this project is deposited at the NHRS.

Swedish faunistic provinces and abbreviations

Sweden is traditionally divided in to faunistic provinces, most based on historical cultural regions overlapping with administrative counties (Fig. 2). They are in the checklist and map abbreviated as below, from south to north.

Sk	Skåne	Ds	Dalsland	Hr	Härjedalen
Bl	Blekinge	Nä	Närke	Jä	Jämtland
Ha	Halland	Sö	Södermanland	Ån	Ångermanland
Sm	Småland	Up	Uppland	Vb	Västerbotten
Öl	Öland	Vs	Västmanland	Nb	Norrboten
Go	Gotland	Vr	Värmland	Ås	Åsele lappmark
GS	Gotska Sandön	Dr	Dalarna	Ly	Lycksele lappmark
Ög	Östergötland	Gä	Gästrikland	Pi	Pite lappmark
Vg	Västergötland	Hs	Hälsingland	Lu	Lule lappmark
Bo	Bohuslän	Me	Medelpad	To	Torne lappmark

Characters

The identification key is intended to be used for adult specimens, both females and males in various life stages and both winged and micropterous forms. For this reason, some species that express great intraspecific variation it is possible to find one species at several locations in the key (indicated by “[part]”). In Thysanoptera the most important morphological characters for species identification include antennal shape, presence, shape, and length

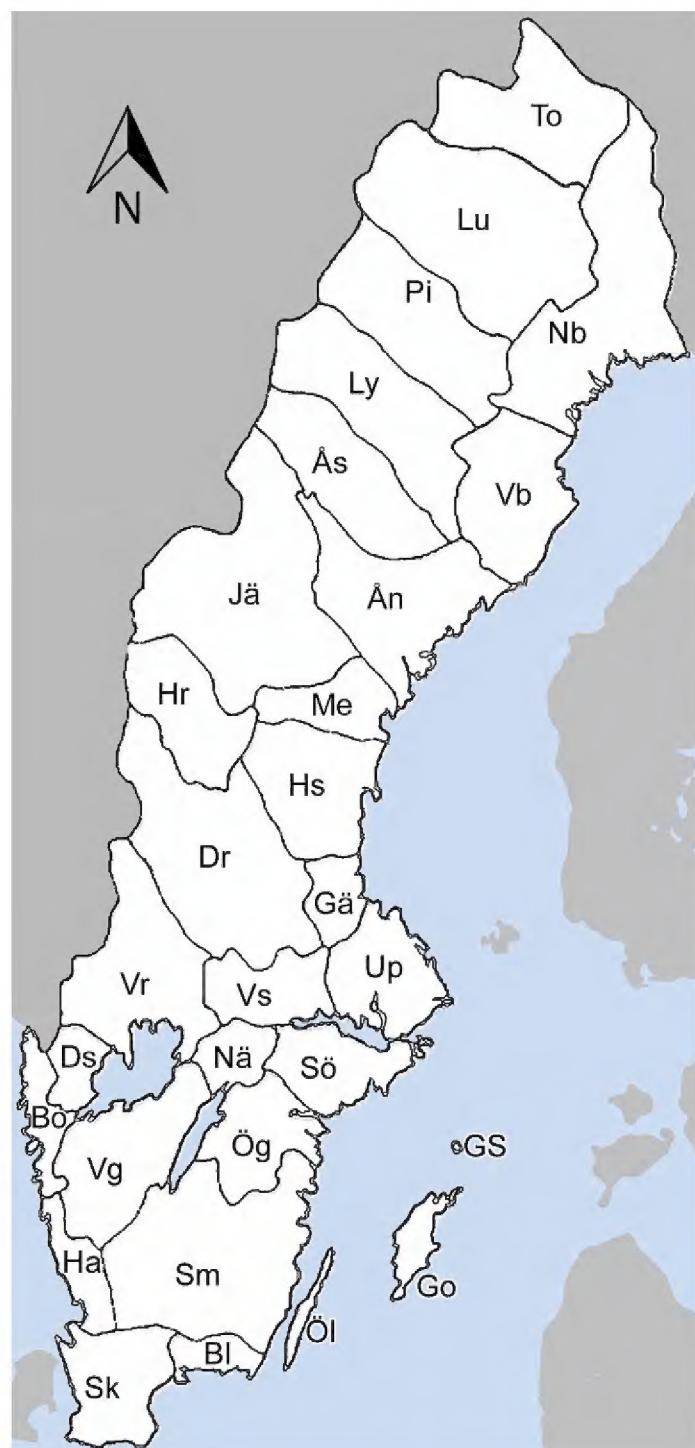


Figure 2. Map of Swedish faunistic provinces.

of setae, structure of mouth parts, and measurements of segments (Fig. 3). This always requires high magnification and specimen preparation. Large setae may be blunt, expanded (Fig. 10G), or acute at apex, and care need to be taken in preparation for avoiding collapse of expanded apices. The antennal segments often carry sensory organs in the shape of large trichomes, sense cones. These are more robust and broader than bristles that they might be confused with (Fig. 6A–C). Maxillary stylets are parts of the feeding apparatus and can be seen in macerated specimens (Fig. 4A, B), and the width and distance of the stylets and presence or absence of the median extension called maxillary bridge are used for separation of subfamilies and species groups. The last abdominal segment, segment X, may be either tapering and longitudinally divided (in most of the Thysanoptera families) or complete and tube-shaped. The latter being one of the defining characters of the family Phlaeothripidae (Fig. 3) and is in the key only referred to as the tube. Comprehensive and detailed descriptions of the anatomy and morphology of Thysanoptera are provided in Schliephake and Klimt (1979) and Moritz (2006).

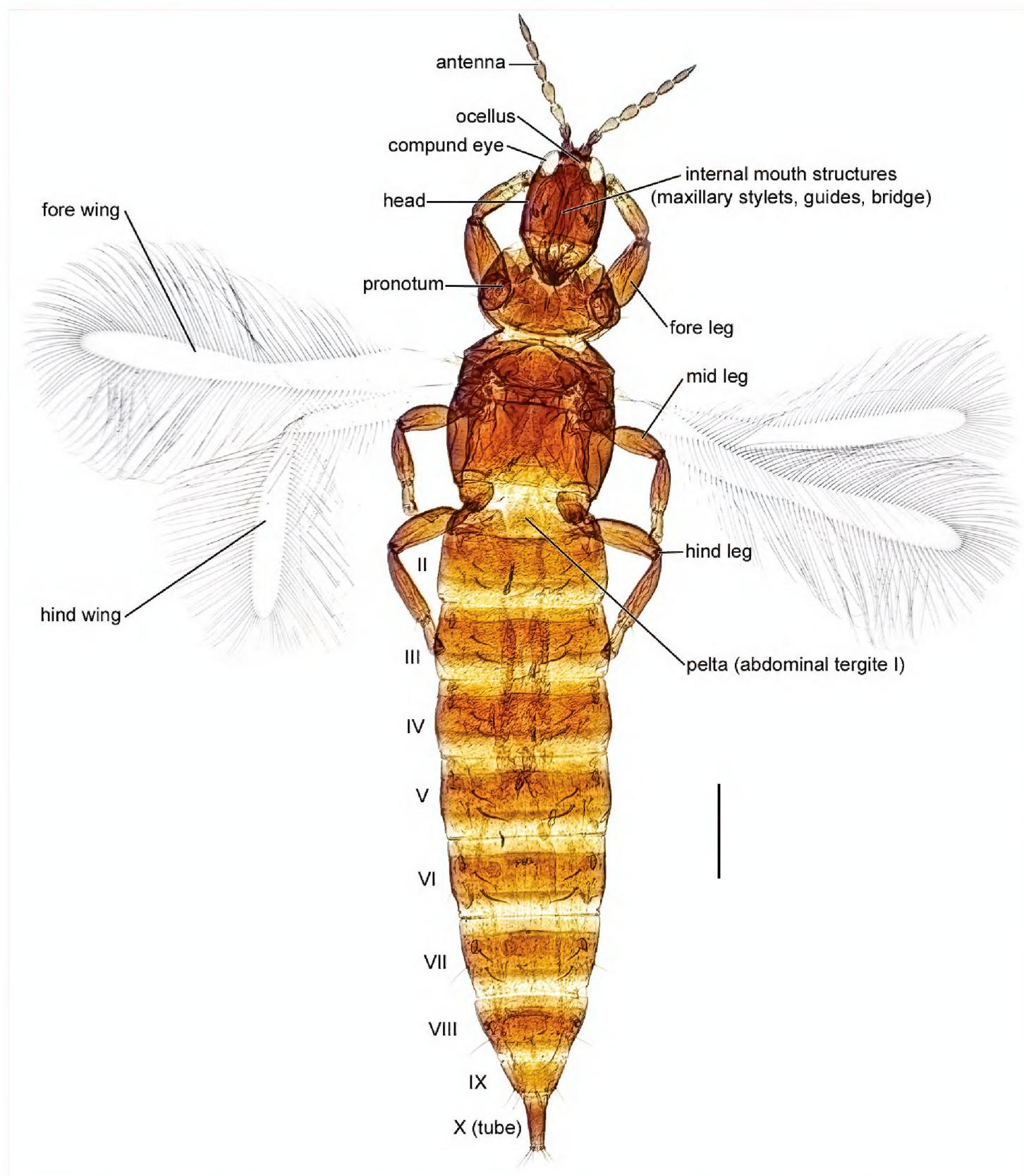


Figure 3. Habitus of *Haplothrips utae*, dorsal view. Roman numbers indicate abdominal segment number. Scale bar: 100 µm.

Taxonomy

Phlaeothripidae Uzel, 1895

Diagnosis. The last abdominal segment, segment X, tubular in both males and females (Figs 3, 5C, 7A, B), without longitudinal division and without saw-like ovipositor. In macropterous forms fore wings without longitudinal veins and surface without microtrichia (Fig. 3). Wing fringes not on sockets but embedded into the wing membrane. Wing retaining setae present in all (European) macropterous species.

Notes. There are about 3,700 known species of Phlaeothripidae in the world (Mound and Tree 2020; ThripsWiki 2022). Most of these species are described from tropical and subtropical areas. In Sweden 49 species are known. The Phlaeothripidae are diverse in their biology; feeding on decaying matter, pollen, fungal spores and hyphae, and prey, and sometimes expressing polymorphism and sociality (Kirk 1996; Mound 2004).

Key to the species of Phlaeothripidae from Sweden

- 1 Maxillary stylets broad, at least 5 µm wide (twice as wide as base of postocular setae) (Fig. 4A)..... **1 (Idolothripinae)**
- Maxillary stylets slender, less than 5 µm wide (Fig. 4B)..... **8 (Phlaeothripinae)**
- 2 (1) Anterior margin of ocellar triangle with long setae (Fig. 4C); large and dark species with elongated head **3**
- Setae at anterior margin of ocellar triangle short or absent (Fig. 4D)..... **5**
- 3 (2) Lateral wings of pelta (abdominal tergite I) slender (Fig. 5E)
- ***Megalothrips bonanni***
- Lateral wings of pelta triangular (Fig. 5D) **4**
- 4 (2) Tarsi pale and tibiae brown (Fig. 5C) ***Bacillothrips nobilis***
- Tarsi and tibiae yellow (Fig. 5F) ***Megathrips lativentris***
- 5 (2) Eyes ventrally elongated (Fig. 5A) **6**
- Eyes ventrally not elongated..... **7**
- 6 (5) Body (excluding antennae, legs, and wings) brown with yellow pronotum and yellow transverse band on metanotum ***Bolothrips bicolor***
- Body uniformly brown ***Bolothrips dentipes***
- 7 (5) Maxillary stylets close together, meeting or almost meeting medially (Fig. 4D)..... ***Cryptothrips nigripes***
- Maxillary stylets widely separated, at least half of head width apart (Fig. 4A)
- ***Bolothrips icarus***
- 8 (1) Maxillary bridge present (Fig. 5B)..... **9**
- Maxillary bridge absent (Fig. 4B) **28**
- 9 (8) Antennal segment IV with 2 sense cones (Fig. 6A) ***Xylaphlothrips fuliginosus***
- Antennal segment IV with 3 or 4 sense cones (Fig. 6B, C)..... **10 (Haplothrips)**
- 10 (9) Antennal segment III without sense cones (cf. Fig. 9E) ***Haplothrips minutus***
- Antennal segment III with at least 1 sense cone **11**
- 11 (10) Antennal segment III with 1 sense cone..... **12**
- Antennal segment III with 2 sense cones..... **14**
- 12 (11) Postocular setae expanded or bluntly pointed (Fig. 6D)
- ***Haplothrips subtilissimus***
- Postocular setae acute (Fig. 6E) **13**
- 13 (12) Tube more than 2.3 times longer than wide (Fig. 7A)
- ***Haplothrips alpester* [part]**
- Tube less than 2.3 times longer than wide (Fig. 7B) ***Haplothrips aculeatus***
- 14 (11) Postocular setae short, not longer than the width of the eye (Fig. 6F) **15**
- Postocular setae well developed and long (Fig. 7C) **18**

- 15 (14) Setae S1 on tergite IX blunt apically (Fig. 7D) **16**
 – Setae S1 on tergite IX acute **17**
- 16 (15) Antennal segment IV yellow at base (Fig. 7E) *Haplothrips leucanthemi*
 – Antennal segment IV completely brown (Fig. 7F)
 *Haplothrips propinquus*
- 17 (15) Both anteromarginal and anteroangular setae stout and at least twice as long as discal setae (Fig. 7G) *Haplothrips alpicola*
 – Anteromarginal setae minute, anteroangular setae sometimes longer but not as stout *Haplothrips angusticornis*
- 18 (14) Setae S1 on tergite IX blunt apically (cf. Fig. 7D) **19**
 – Setae S1 on tergite IX acute **21**
- 19 (18) Postocular setae acute (Fig. 7H) *Haplothrips tritici* [part]
 – Postocular setae bluntly pointed (Fig. 5B) **20**
- 20 (19) Maxillary stylets one 1/3–1/4 of head width apart (Fig. 5B); tibia I brown ...
 *Haplothrips senecionis*
 – Maxillary stylets about 1/5 of the head width apart (Fig. 7C); tibia I yellow apically *Haplothrips statices*
- 21 (18) Distal cilia of fore wings with barbs (in high magnification), in lower magnification visible as a rough or frizzled surface (Fig. 8A) *Haplothrips setiger*
 – Distal cilia of fore wings smooth **22**
- 22 (21) Postocular setae bluntly pointed (Fig. 8B) **23**
 – Postocular setae acute (Fig. 7H) **24**
- 23 (22) Maxillary stylets about a fourth of head width apart (Fig. 8B); tibia I yellow but brown basally *Haplothrips verbasci*
 – Maxillary stylets about half of head width apart (Fig. 8C); tibia I wholly yellow *Haplothrips acanthoscelis*
- 24 (22) Maxillary stylets close together, almost meeting medially (Fig. 8D)
 *Haplothrips utae*
 – Maxillary stylets at least a third of head width apart (Fig. 4E) **25**
- 25 (24) Maxillary stylets half of head width apart (cf. Fig. 8C)
 *Haplothrips distinguendus*
 – Maxillary stylets 0.3–0.4 of head width apart (Fig. 7H) **26**
- 26 (25) Antennal segments III–IV, sometimes also V–VI, brown with yellow base, segments VII–VIII brown (Fig. 8E) *Haplothrips hukkinenii*
 – Antennal segment III shaded yellow to light brown, IV–VII brown (Fig. 8F)
 **27**
- 27 (26) Anteromarginal setae short, about as long as discal setae (Fig. 8G)
 *Haplothrips alpester* [part]
 – Anteromarginal setae long, at least twice as long as discal setae (cf. Fig. 7G) *Haplothrips tritici* [part]
- 28 (8) Fore femora with apical teeth (Fig. 9A); 3 sense cones on antennal segment III–IV (Fig. 9B) *Acanthothrips nodicornis*
 – Fore femora without apical teeth; if teeth are present then antennal segment IV with 4 sense cones **29**

- 29 (28) Eyes ventrally elongated (Fig. 9C) *Cephalothrips monilicornis*
 – Eyes not ventrally elongated 30
- 30 (29) Mouth cone long and pointed, extending beyond posterior margin of pronotum (Fig. 9D) *Poecilotrips albopictus*
 – Mouth cone shorter 31
- 31 (30) Antennal segment III without sense cones (Fig. 9E) *Lispothrips crassipes*
 – Antennal segment III with at least 1 sense cone (Fig. 9F) 32
- 32 (31) Antennal segment III with 1 sense cone 33 (*Liothrips*)
 – Antennal segment III with 2 or 3 sense cones (Fig. 9F) 34
- 33 (32) Setae S1 on abdominal tergite IX about as long as tube (Fig. 9G)
 *Liothrips austriacus*
 – Setae S1 on abdominal tergite IX about half as long as tube (Fig. 10A)
 *Liothrips setinodis*
- 34 (32) Abdomen clearly bicolored, with at least segment VIII–IX largely yellow (Fig. 10B); tube yellow but often with dark transverse terminal band or shading; micropterous forms usually with head and pronotum yellow 35
 – Abdomen uniformly brown or uniformly yellow, sometimes with pale or red markings 36
- 35 (34) Abdominal segment VIII–X yellow (Fig. 10B) *Hoplothrips pedicularius*
 – Abdominal segment VI–X yellow *Hoplothrips caespitis* [part]
- 36 (34) Pronotum with 5 pairs of well-developed setae, sometimes short but stout (Fig. 10C) 37
 – Pronotum with 4 pairs of well-developed setae, anteromarginals not distinctly stouter than discal setae 43
- 37 (36) Postocular setae present but short, shorter or as long as width of eyes (Fig. 10D); setae S1 on abdominal tergite IX distinctly shorter than half of the length of tube (Fig. 10F) 38 (*Phlaeothrips*)
 – Postocular setae well developed and as long as or longer than the length of eyes (Fig. 10E); setae S1 on abdominal tergite IX at least half as long as tube (Fig. 10G) 41
- 38 (37) Head with lateral tubercles (Fig. 10H) 39
 – Head without lateral tubercles (Fig. 10D) 40
- 39 (38) Antennal segment III about 3 times as long as wide. Tibia I often completely yellow (Fig. 10I) *Phlaeothrips coriaceus*
 – Antennal segment III less than 2.6 times as long as wide. Tibia I usually yellow apically (Fig. 10J) *Phlaeothrips denticauda*
- 40 (38) Fore tibiae largely yellow, mid and hind tibiae distinctly bicolored with yellow apex and base (Fig. 10K) *Phlaeothrips annulipes*
 – All tibiae brown *Phlaeothrips bispinosus*
- 41 (37) Postocular setae (Fig. 10E) and setae S1 on abdominal tergite IX expanded apically (Fig. 10G). Fore wings constricted medially
 *Hoplandrothrips bidens*
 – Postocular setae and setae S1 on abdominal tergite IX acute. Fore wings parallel sided 42

- 42 (41) Large pronotal setae expanded apically (Fig. 11A) *Holothrips schaubergeri*
 – Large pronotal setae acute *Hoplothrips polysticti* [part]
- 43 (36) Antennal segment IV with 2 sense cones (Fig. 9F) 44
 – Antennal segment IV with 3 or 4 sense cones 48
- 44 (43) Maxillary stylets about 1/3 of head width apart (Fig. 11B) 45
 – Maxillary stylets close together, meeting or almost meeting medially (Fig. 4B) 46
- 45 (44) Large pronotal setae expanded apically (cf. Fig. 11A). Antennal segments VII and VIII broadly attached *Hoplothrips longisetis*
 – Pronotal setae acute *Hoplothrips caespitis* [part]
- 46 (44) Setae S1 as long as or longer than tube (Fig. 11C) ... *Hoplothrips unicolor* [part]
 – Setae S1 shorter than tube 47
- 47 (46) Antennal segment I slightly tapering apically, apical width less than 40 microns (Fig. 11D). Macropterous females with clusters of small sense cones on antennal segments IV–V (Fig. 11D) *Hoplothrips semicaecus* [part]
 – Antennal segment I more evenly tubular, apical width more than 40 microns *Hoplothrips carpathicus*
- 48 (43) Antennal segment IV with 3 sense cones 49
 – Antennal segment IV with 4 sense cones 52
- 49 (48) Macropterous females with cluster of small sense cones on antennal segments IV–V (Fig. 11D). Males with small eyes, abdominal sternite VIII with irregularly and broadly shaped glandular pore area on sternite VIII
 *Hoplothrips semicaecus* [part]
 – Antennal segments different. Males without consciously small eyes, if small then with a defined circular glandular pore area on abdominal sternite VIII (Fig. 11E) 50
- 50 (49) Setae S1 on abdominal tergite IX blunt apically (Fig. 11F)
 *Thrybothrips unicolor*
 – Setae S1 on tergite abdominal IX acute (Fig. 11G) 51
- 51 (50) Setae S1 on abdominal tergite IX as long as or longer than tube (Fig. 11C) ..
 *Hoplothrips unicolor* [part]
 – Setae S1 on abdominal tergite IX shorter than tube (Fig. 11G)
 *Hoplothrips polysticti* [part]
- 52 (48) Major pronotal setae expanded (cf. Fig. 11A) ... *Hoplandrothrips williamsianus*
 – Major pronotal setae acute or blunt, not expanded 53
- 53 (52) Antennal segment III asymmetric with long and strongly inwards curving sense cone at inner margin (Fig. 11H) *Hoplothrips fungi*
 – Sense cones on segment III forwardly pointing and stout 54
- 54 (53) Antennal segments IV–VI brown, IV at most slightly shaded (Fig. 11D) 55
 – Antennal segments IV–VI bicolored with basal half yellow (Fig. 11I) 56
- 55 (54) Antennal segment VIII not distinctly constricted at base, VII and VIII confluent (Fig. 11D) *Hoplothrips semicaecus* [part]
 – Antennal segment VIII constricted at base, separating VII and VIII (Fig. 11J) *Hoplothrips polysticti* [part]

- 56 (54) All tibiae completely yellow (Fig. 11K) *Hoplothrips corticis*
– Only fore tibia yellow, mid and hind tibiae at most yellow basally and apically
(Fig. 11L) *Hoplothrips ulmi*

Checklist of the Swedish Phlaeothripidae

Idolothripinae Bagnall, 1908

Diagnosis. The Idolothripinae are distinguished by the broad maxillary stylets. The maxillary stylets are at least 5 µm broad.

Notes. There are seven known species in Sweden in this subfamily. The broad maxillary stylets are hypothesized to be an adaptation to feeding on fungal spores (Mound and Palmer 1983).

***Bacillothrips* Buffa, 1908**

***Bacillothrips nobilis* (Bagnall, 1909)**

Figs 4C, 5C, D

Distribution. Go.

Remarks. First record for Sweden. In Fennoscandia this species has previously been recorded from Denmark, Norway, and Finland (Kobro 2011; Gertsson 2015b). Feeding on fungal spores (Mound 1974), and found in dry grass, sedges, and on dead branches mainly from *Salix* L. (Mound et al. 1976; Schliephake and Klimt 1979).

Material examined. SWEDEN • 1♀; Gotland, Gotlands kommun, Vitärtskällan; 57.8512°N, 18.8123°E; 10 Jul. 2011; B. Eklund, leg.; Malaise trap; Loc. 029-06.

***Bolothrips* Priesner, 1926**

***Bolothrips bicolor* Heeger, 1852**

Distribution. Up.

***Bolothrips dentipes* (Reuter, 1880)**

Fig. 5A

Distribution. Sk, Sm, Öl, Ög, Bo, Sö, Up, Lu.

***Bolothrips icarus* (Uzel, 1895)**

Fig. 4A

Distribution. Sk, Öl, Go, GS, Sö, Up.

Remark. First record for Sö.

Material examined. SWEDEN • 1♀; Södermanland, Nyköping kommun, Skeppsvik; dry meadow at roadside with *Crepis*, *Vicia*, and *Plantago*; 58.6399°N, 16.8225°E; 3 Jun. 2021; E. Wahlberg, leg.

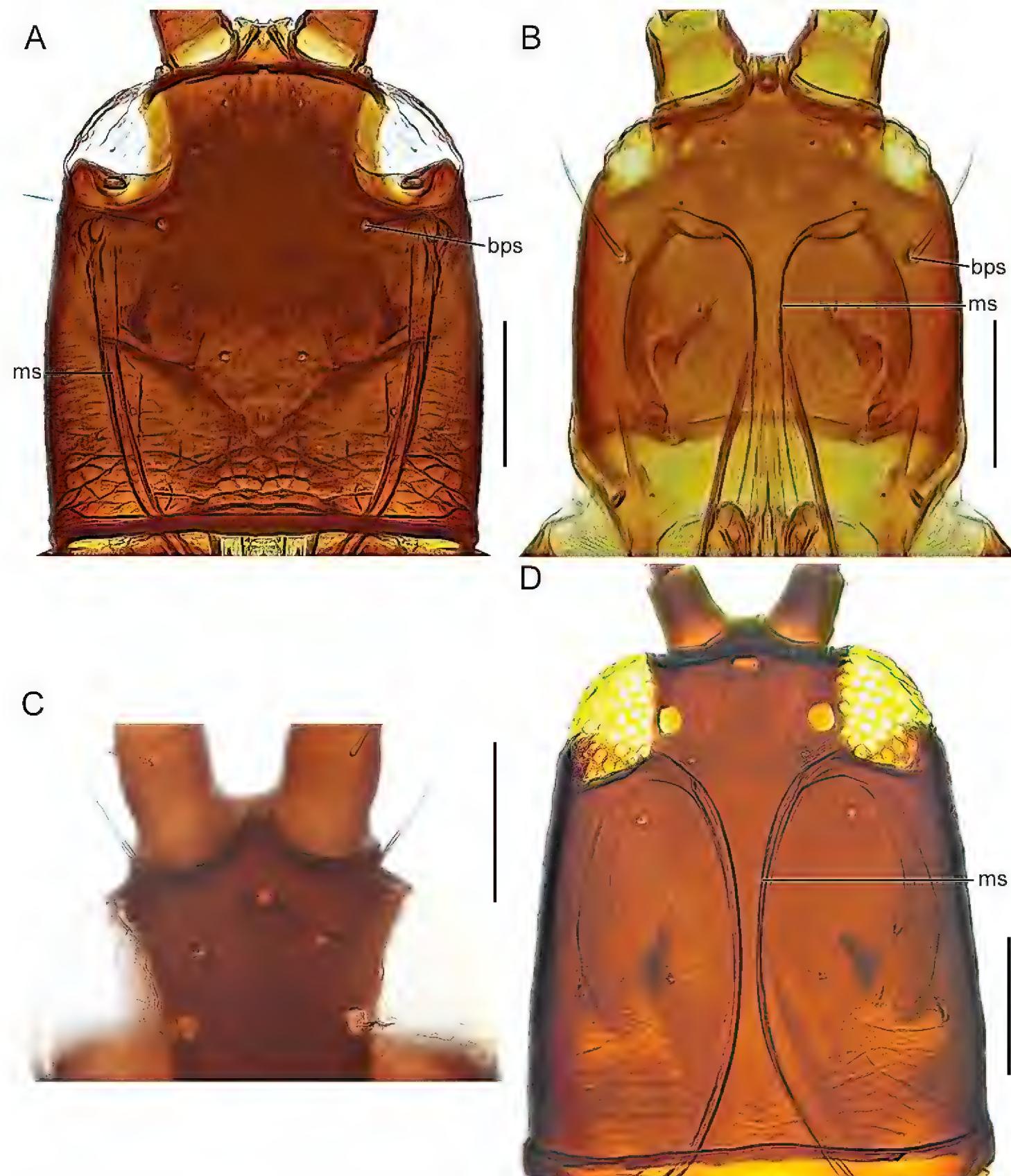


Figure 4. head, dorsal view **A** *Bolothrips icarus* **B** *Hoplothrips carpathicus* **C** *Bacillothrips nobilis* (ocellar triangle) **D** *Cryptothrips nigripes*. Abbreviations: bps: base of postocular seta, ms: maxillary stylets. Scale bars: 100 µm.

Cryptothrips Uzel, 1895*Cryptothrips nigripes* (Reuter, 1880)

Fig. 4D

Distribution. Sk, Sm, Öl, Bo, Sö, Up, Vs, Vr, Dr, Lu.*Megathrips* Targioni-Tozzetti, 1881*Megathrips lativentris* (Heeger, 1852)

Fig. 5F

Distribution. Sk, Bl, Sm, Öl, Go, GS, Ög, Vg, Bo, Ds, Nä, Sö, Up, Vr, Dr, Gä, Hs, Me, Hr, Jä, Ån, Vb, Nb, Ly, Pi, Lu, To.*Megalothrips* Uzel, 1895*Megalothrips bonanni* Uzel, 1895

Fig. 5E

Distribution. Sk.*Phlaeothripinae* Uzel, 1895**Diagnosis.** Differentiated from Idolothripinae by the slender maxillary stylets, at most 3 microns wide.**Notes.** The majority of phlaeothripids belongs to this subfamily; from Sweden 42 species are known. The life histories are very varying, ranging from species feeding on fungal hyphae to predatory species (Mound and Tree 2020).*Acanthothrips* Uzel, 1895*Acanthothrips nodicornis* (Reuter, 1880)

Fig. 9A, B

Distribution. Sm, Bo, Sö, Up, Vs, Vr, Dr.*Cephalothrips* Uzel, 1895*Cephalothrips monilicornis* (Reuter, 1880)

Fig. 9C

Distribution. Sk, Vg, Öl, Sm, Sö, Up, Vr.

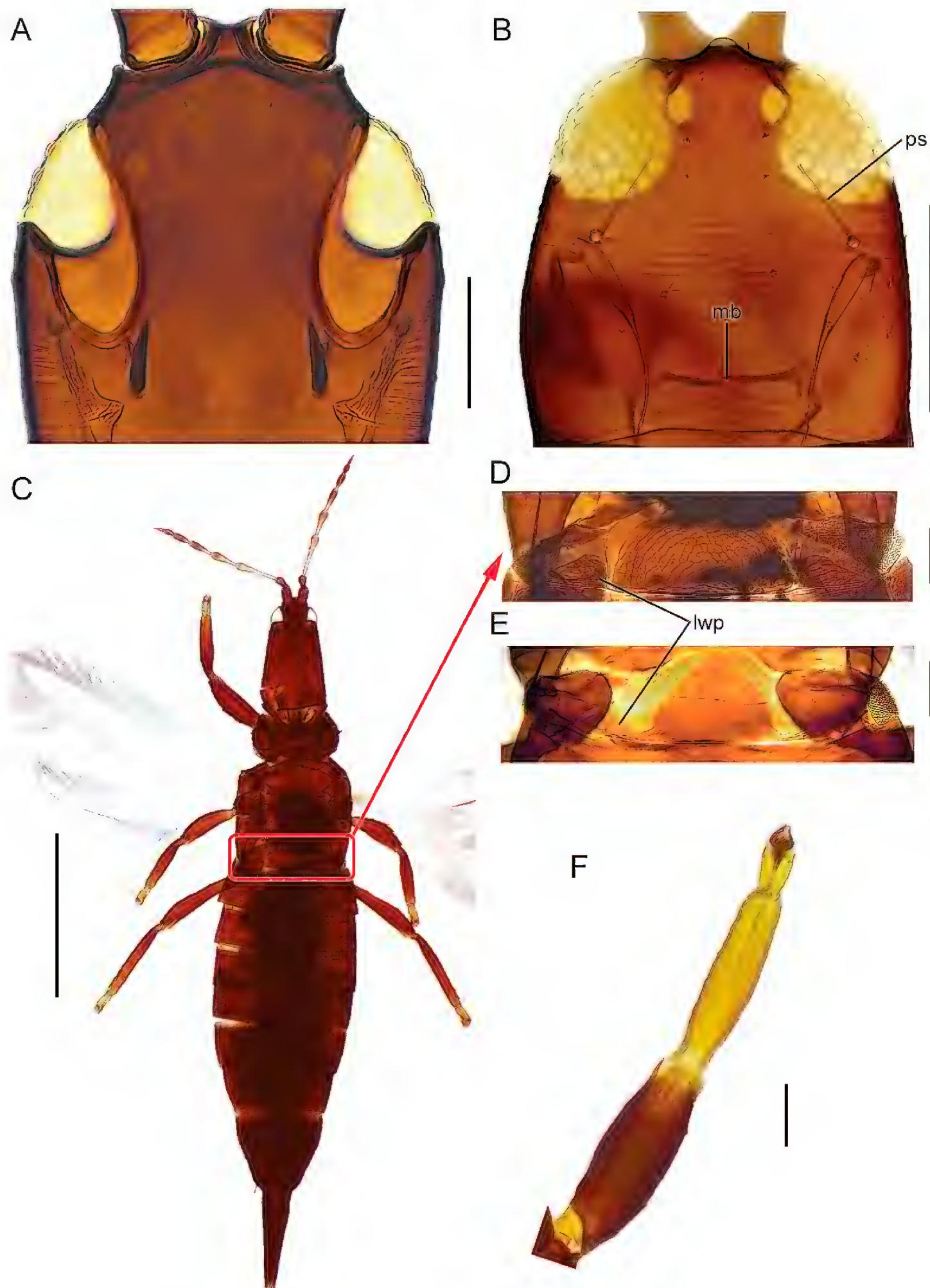


Figure 5. **A, B** head, dorsal view **A** *Bolothrips dentipes* (ventral margins of eyes also visible) **B** *Haplothrips senecionis* **C** habitus, dorsal view, *Bacillothrips nobilis* **D, E** pelta **D** *B. nobilis* **E** *Megalothrips bonanni* **F** fore leg, *Megathrips lativentris*. Abbreviations: mb: maxillary bridge, ps: postocular setae, lwp: lateral wings of pelta. Scale bars: 100 µm (**A, B, D, E**), 1 mm (**C**).

Remark. First record for Vg.

Material examined. SWEDEN • 2♀♀; Västergötland, Laxå kommun, Finnerödja; sandy slope with *Carex* and *Calluna*; 58.9297°N, 14.3400°E; 5 Jun. 2021; E. Wahlberg, leg.

Haplothrips Amyot & Serville, 1843

Haplothrips acanthoscelis (Karny, 1910)

Fig. 8C

Distribution. Sk, Öl.

Haplothrips aculeatus (Fabricius, 1803)

Fig. 7B

Distribution. Sk, Bl, Ha, Sm, Öl, Go, Ög, Vg, Bo, Sö, Up.

Remarks. First record for Ha.

Material examined. SWEDEN • 1♀; Halland, Varberg kommun, Tvååker; meadow on old cultivated land with *Quercus*, *Fagus*, and *Fraxinus*; 57.0208°N, 12.4795°E; 19 May 2021; E. Wahlberg, leg.

Haplothrips alpester Priesner, 1914

Figs 6E, 7A, 8G

Distribution. Sk, Öl, Vg, Sö, Vr, Ly.

Remarks. First record for Sö. This species is variable in the number of sense cones on segment III.

Material examined. SWEDEN • 1♂; Södermanland, Nyköping kommun, Skeppsvik; marsh with *Hierochloë*, *Juncus*, *Carex*, *Luzula* and *Schoenoplectus*; 58.6456°N, 16.8431°E; 3 Jun. 2021; E. Wahlberg, leg.

Haplothrips alpicola Priesner, 1950

Fig. 7G

Distribution. Ly.

Haplothrips angusticornis Priesner, 1921

Distribution. Sk, Ög, Up, Vr.

Haplothrips distinguendus (Uzel, 1895)

Distribution. Sk, Sm, Vg, Up.

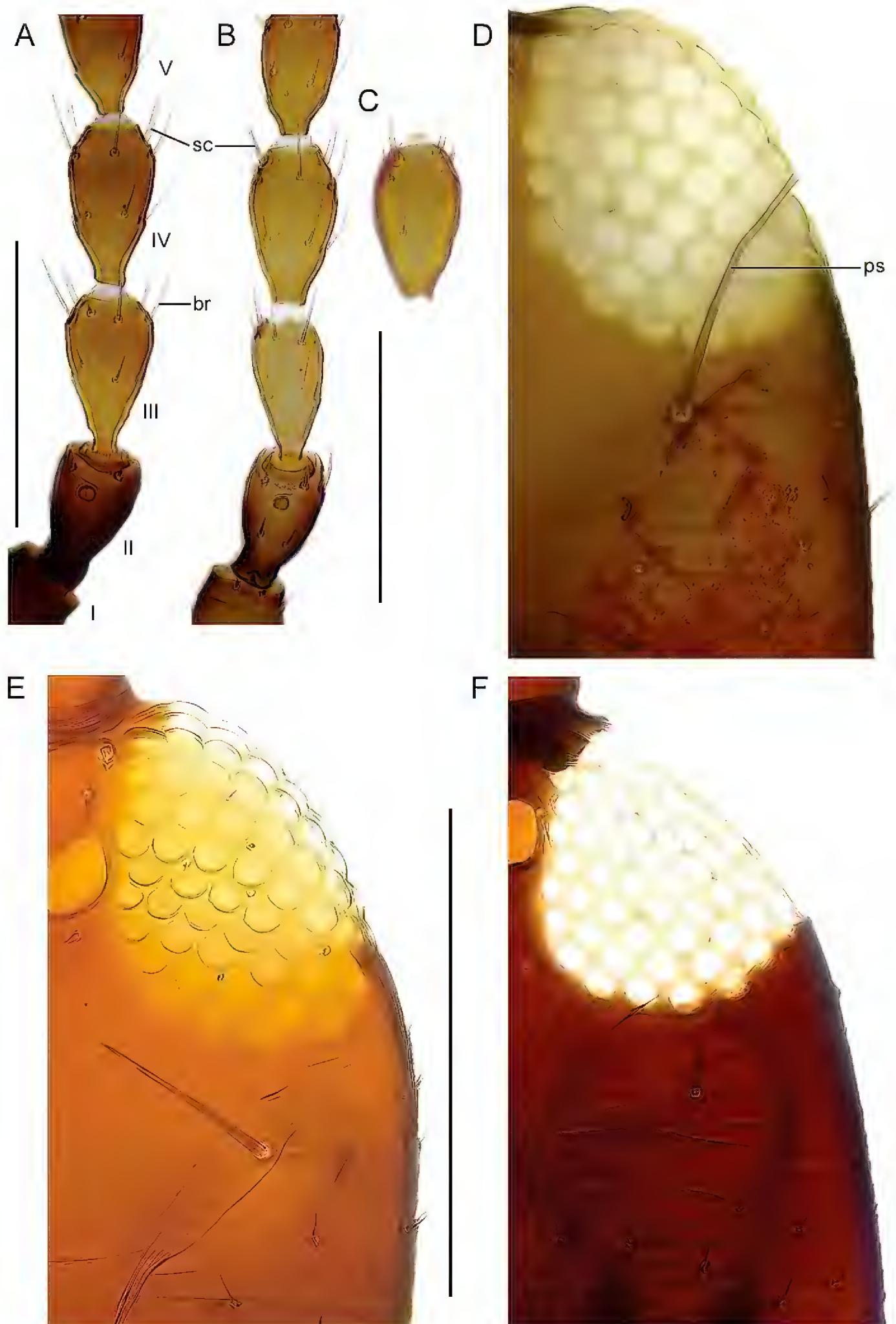


Figure 6. **A–C** part of antenna, dorsal view, I–VI: segment number **A** *Xylaphlothrips fuliginosus* **B** *Haplothrips subtilissimus* **C** segment IV, ventral view, *H. subtilissimus* **D–F** dorsal view of right side of head **D** *H. subtilissimus* **E** *H. alpester* **F** *H. leucanthemi*. Abbreviations: sc: sense cones, br: bristle, ps: postocular setae. Scale bars: 100 μ m.

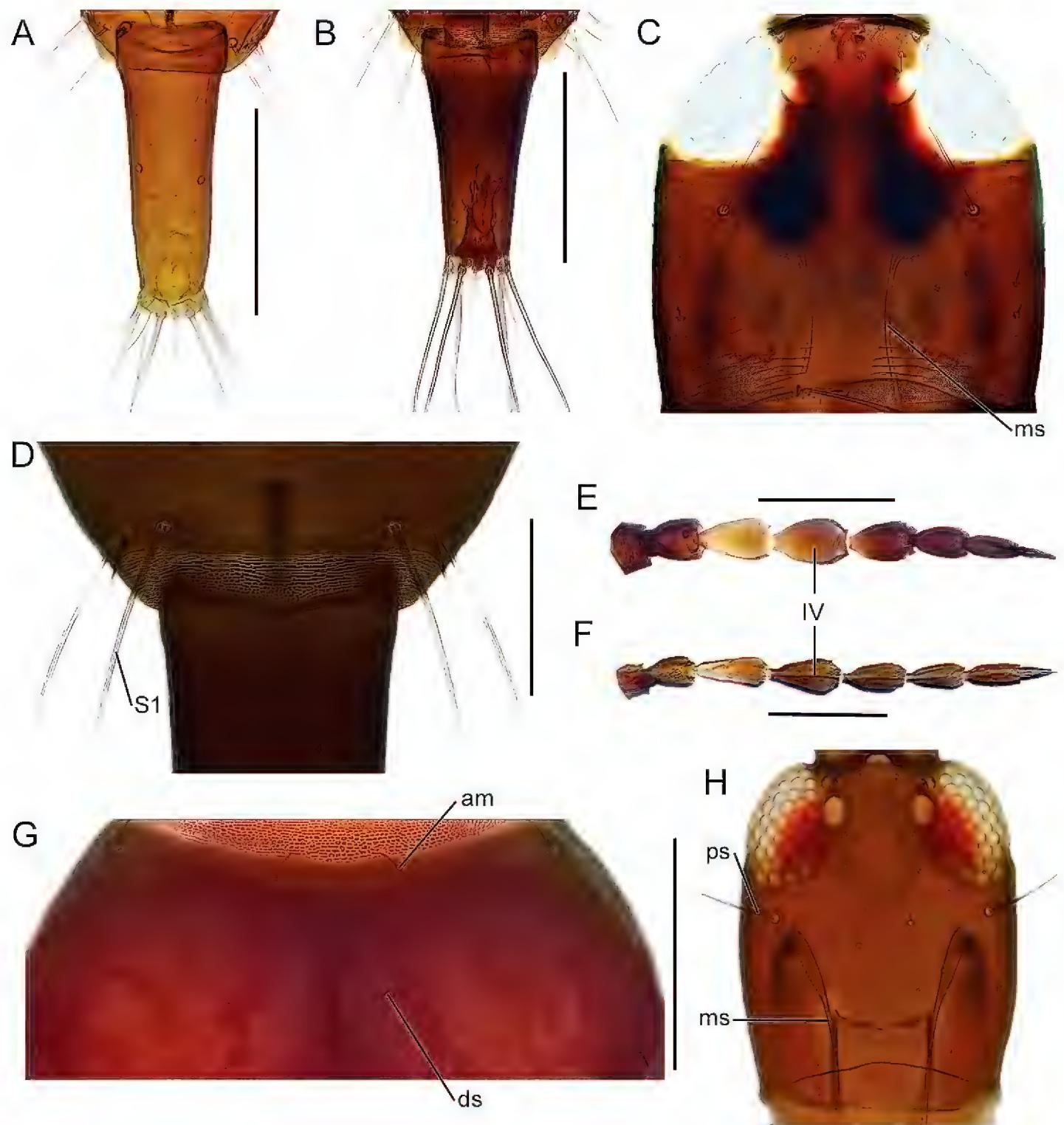


Figure 7. **A, B** dorsal view of tube **A** *Haplothrips alpester* **B** *H. aculeatus* **C** head, dorsal view, *H. statices* **D** tergite IX, dorsal setae, *H. leucanthemi* **E, F** antennae, dorsal view, antennal segment IV marked **E** *H. leucanthemi* **F** *H. propinquus* **G** part of pronotum, dorsal view, *H. alpicola* **H** head dorsal view, *H. tritici*. Abbreviations: ms: maxillary stylets, S1: setae 1, am: anteromarginal setae, ds: discal setae, ps: postocular setae. Scale bars: 100 microns.

***Haplothrips bukkineni* Priesner, 1939**

Fig. 8E

Distribution. Sk, Sm, Öl, Go Sö, Up, Vr.

***Haplothrips leucanthemi* (Schrank, 1781)**

Figs 1, 6F, 7D–E

Distribution. Sk, Ha, Sm, Öl, Bo, Ds, Nä, Ög, Sö, Up, Vr, Jä, Vb, Lu, To.

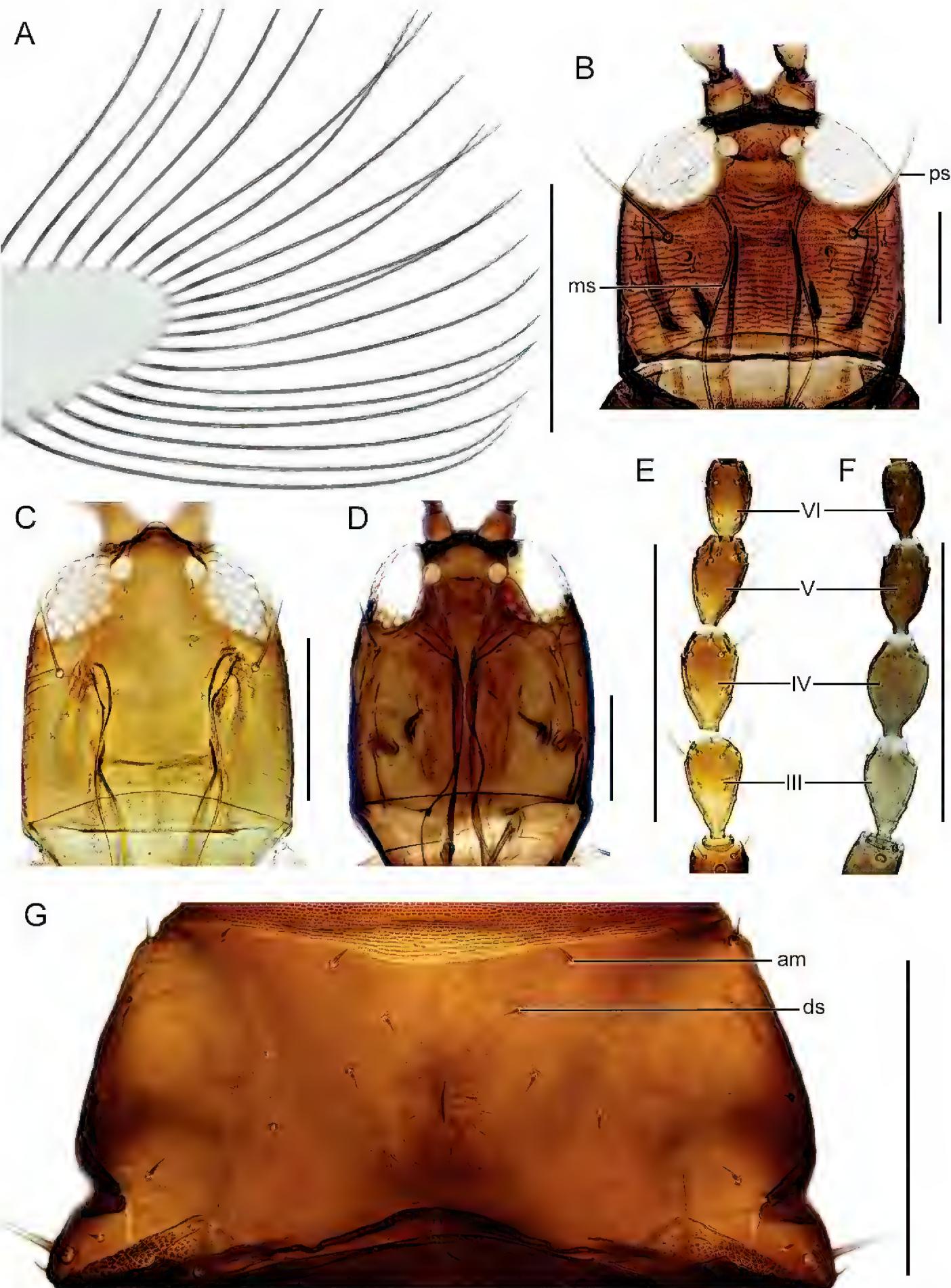


Figure 8. **A** distal portion of fore wing, *Haplothrips setiger* **B-D** dorsal view of head **B** *H. verbasci* **C** *H. acanthoscelis* **D** *H. utae* **E, F** antennae, III–VI: segment number **E** *H. hukkanenii* **F** *H. tritici* **G** pronotum, dorsal view, *H. alpester*. Abbreviations: ps: postocular setae, ms: maxillary stylets, am: anterom marginal setae, ds: discal setae. Scale bars: 100 µm.

Remark. First record for Ha.

Material examined. SWEDEN • 1♂; Halland, Halmstad kommun, Särdal; on *Armeria maritima*; 56.7367°N, 12.6472°E; 19 May 2021; E. Wahlberg, leg.

Haplothrips minutus* (Uzel, 1895)*Distribution.** Sk, Sö.***Haplothrips propinquus* Bagnall, 1933**

Fig. 7F

Distribution. Sk, Sö, Up, Vr, Gä, Hs, Jä, Lu.***Haplothrips senecionis* Bagnall, 1932**

Fig. 5B

Distribution. Öl.***Haplothrips setiger* Priesner, 1921**

Fig. 8A

Distribution. Sk.***Haplothrips statices* (Haliday, 1836)**

Fig. 7C

Distribution. Sk, Bl, Ha, Sm, Öl, Ög, Bo, Sö, Up, Hs, Hr, Jä, Ån, Nb, Lu.***Haplothrips subtilissimus* (Haliday, 1852)**

Fig. 6B–D

Distribution. Sk, Sm, Sö, Up.**Remark.** First record for Sm.**Material examined.** SWEDEN • 1♀; Småland, Kalmar kommun, Bottorp; alley with *Quercus* and *Prunus*; 56.591923°N, 16.212710°E; 11 May 2021; E. Wahlberg, leg.***Haplothrips tritici* (Kurdjumov, 1912)**

Figs 7H, 8F

Distribution. Sö.**Remark.** Setae variable in shape.***Haplothrips utae* Klimt, 1970**

Figs 3, 8D

Distribution. Sk, Sm.

Haplothrips verbasci Osborn, 1896

Fig. 8B

Distribution. Sk.*Holothrips* Karny, 1911*Holothrips schaubergeri* (Priesner, 1920)

Fig. 11A

Distribution. Sö.*Hoplandrothrips* Hood, 1912*Hoplandrothrips bidens* (Bagnall, 1910)

Fig. 10E, G

Distribution. Sk, Öl, Up.*Hoplandrothrips williamsianus* Priesner, 1923**Distribution.** Vr.*Hoplothrips* Amyot & Serville, 1843*Hoplothrips caespitis* (Uzel, 1895)**Distribution.** Sk.

Remarks. This species is variable in body colour, occurring in both bicolored and completely brown forms.

Hoplothrips carpathicus Pelikán, 1961

Fig. 4B

Distribution. Sk, Ds, Sö, Up, Vr.*Hoplothrips corticis* (de Geer, 1773)

Fig. 11K

Distribution. Sk, Bl, Öl, Go, GS, Sm, Ög, Bo, Sö, Up, Vb, Nb.**Remark.** First record for Nb.

Material examined. SWEDEN • 1♀; Norrbotten, Åsele, Björnlandet national park; 63.9702°N, 18.0533°E; 12–26 Jul. 2011; K. Norberg, B.O. Johansson, leg.; Malaise trap; Loc. 034-04.

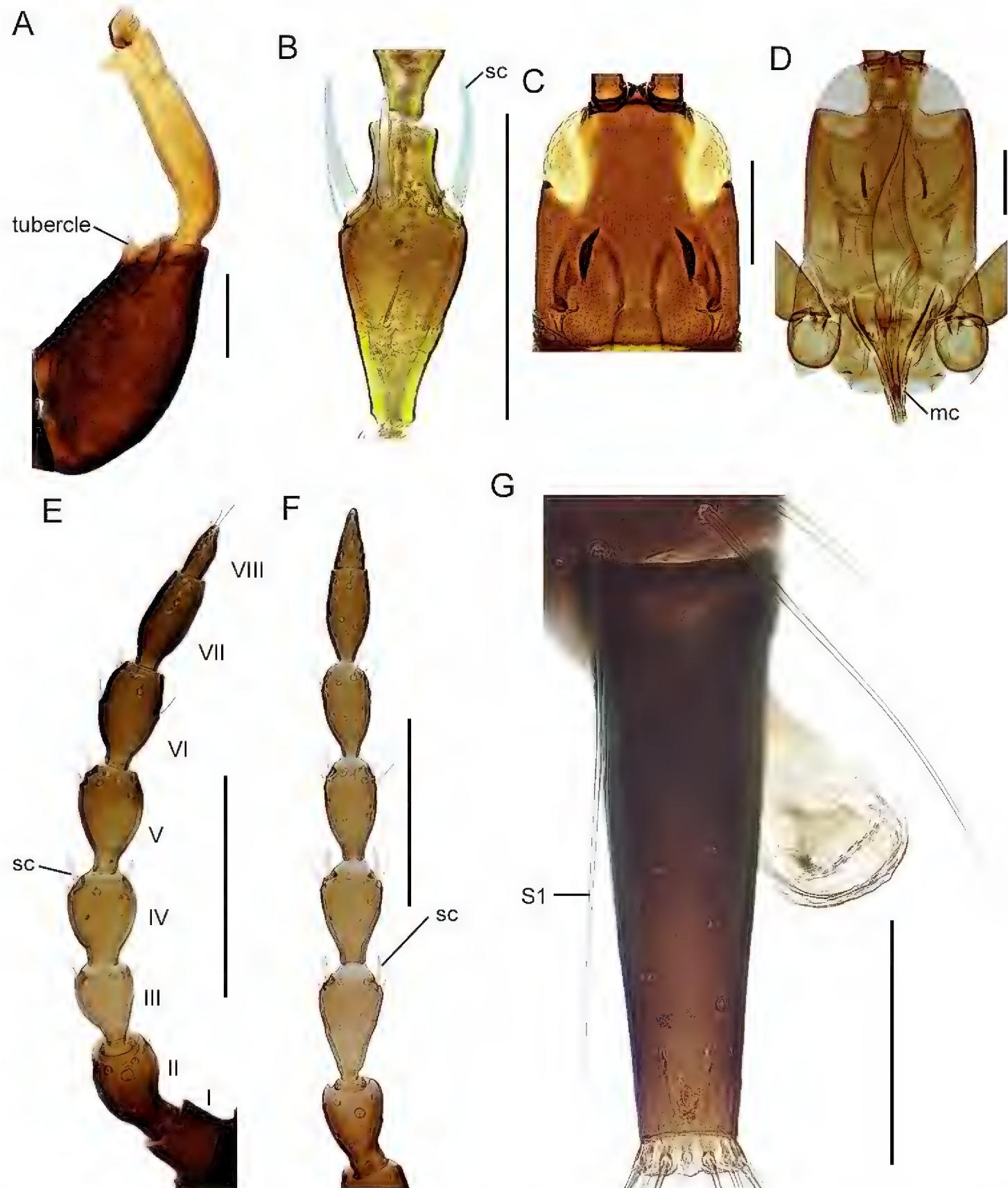


Figure 9. **A** fore leg, *Acanthothrips nodicornis* **B** antennal segment IV, *A. nodicornis* **C** head, ventral view, *Cephalothrips monilicornis* **D** head and pronotum with mouth cone (mesonotum detached), *Poecilotriphs albopictus* **E, F** antennae, I–VIII: segment number **E** *Lispothrips crassipes* **F** *Hoplothrips longisetis* **G** abdominal segments IX–X, parts of the protruding phallus visible right side under the tube, *Liothrips austriacus*. Abbreviations: sc: sense cones, mc: mouth cone, S1: setae 1. Scale bars: 100 μ m.

Hoplothrips fungi (Zetterstedt, 1828)

Fig. 11H

Distribution. Bl, Öl, Go, Up, Hs.

Hoplothrips longisetis (Bagnall, 1910)

Figs 9F, 11B

Distribution. Sk, Ds, Vr.*Hoplothrips pedicularius* (Haliday, 1836)

Fig. 10B

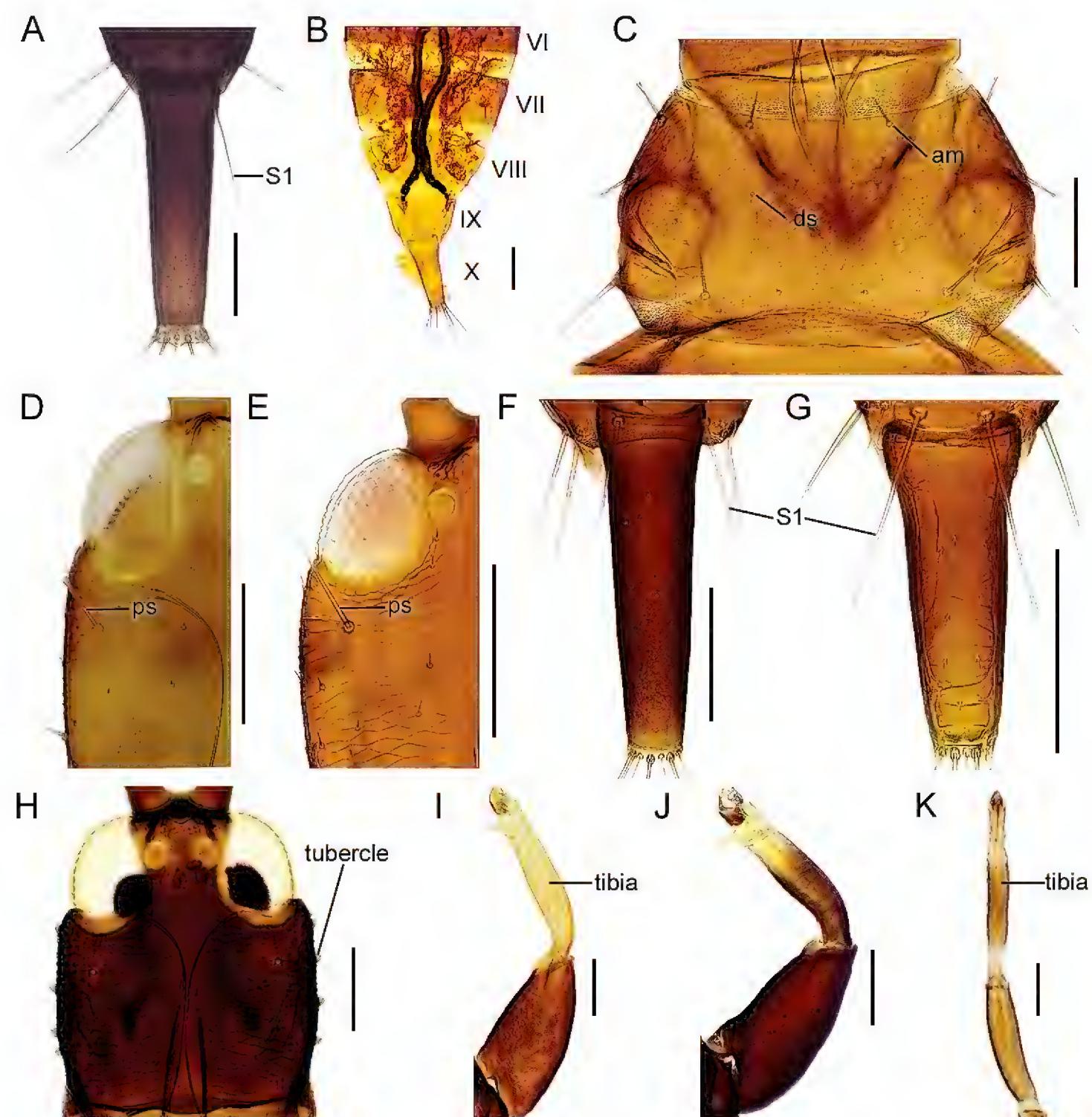
Distribution. Sk, Sm, Sö, Up, Vr, Dr, Hs.

Figure 10. **A** abdominal segments IX–X, *Liothrips setinodis* **B** abdomen, dorsal view, VI–X: segment number, *Hoplothrips pedicularius* **C** pronotom, dorsal view, *Phlaeothrips annulipes* **D–E** left half of head, dorsal view **D** *P. annulipes* **E** *Hoplandothrips bidens* **F, G** abdominal segments IX (setae) and X **F** *P. annulipes* **G** *H. bidens* **H** head, dorsal view, *Phlaeothrips coriaceus* **I–K** fore legs, dorsal view **I** *P. coriaceus* **J** *P. denticauda* **K** mid leg, *P. annulipes*. Abbreviations: S1: setae 1, am: anteromarginal setae, ds: discal setae, ps: postocular setae. Scale bars: 100 µm.

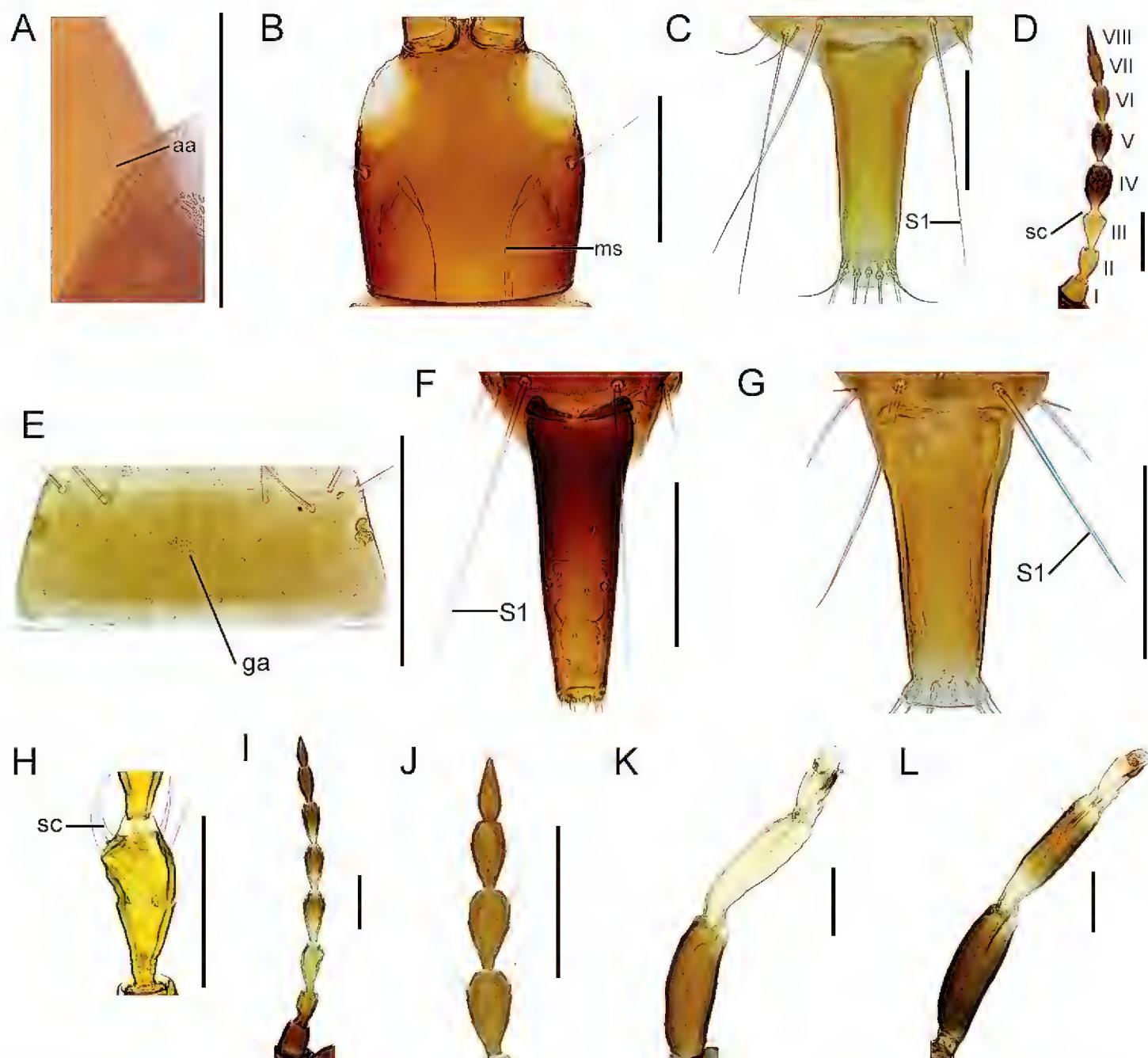


Figure 11. **A** anterolateral portion of pronotum, dorsal view, *Holothrips schaubergeri* **B** head, dorsal view, *Hoplothrips longisetis* **C** segments IX (setae) and X, *H. unicolor* **D** antennae, I–VIII: segment number, *H. semicaecus* **E** abdominal sternite VIII, *H. unicolor* **F**, **G** abdominal segments IX–X **F** *Thorybothrips unicolor* **G** *Hoplothrips polysticti* **H** antennal segment III, *H. fungi* **I** antenna, *H. ulmi* **J** antennal segments V–VIII, *H. polysticti* **K**, **L** mid leg **K** *H. corticis* **L** *H. ulmi*. Abbreviations: aa: anteroangular setae, ms: maxillary stylets, sc: sense cones, ga: glandular pore area. Scale bars: 100 µm.

Hoplothrips polysticti (Morison, 1949)

Fig. 11G, J

Distribution. Sk, Ög, Vr, Dr, Vb.

Remarks. This species is variable in the number of sense cones on both antennal segments III and IV, as well as in number of large pronotal setae.

Hoplothrips semicaecus (Uzel, 1895)

Fig. 11D

Distribution. Sk, Ha, Up.

Remarks. First record for Ha. Very variable in the number of sense cones on both antennal segments III and IV, as well as many structural differences in macropterous and apterous males and females.

Material examined. SWEDEN • 3♂♂; Halland, Falkenberg kommun, Vessigebro; deciduous forest (*Fagus*), in *Fomes fomentarius*; 57.0575°N, 12.7888°E; 18 May 2021; E. Wahlberg, leg.

***Hoplothrips ulmi* (Fabricius, 1781)**

Fig. 11I, L

Distribution. Sk, Bl, Ha, Sm, Öl, Go, GS, Ög, Bo, Ds, Sö, Up, Vs, Vr, Dr, Ån, Vb, Lu.

***Hoplothrips unicolor* (Vuillet, 1914)**

Fig. 11C, E

Distribution. Sö.

Remark. This species is variable in the number of sense cones on antennal segment IV.

***Liothrips* Uzel, 1895**

***Liothrips austriacus* (Karny, 1910)**

Fig. 9G

Distribution. Vr.

***Liothrips setinodis* (Reuter, 1880)**

Fig. 10A

Distribution. Ha, Up.

***Lispothrips* Reuter, 1899**

***Lispothrips crassipes* (Jablonowski, 1894)**

Fig. 9E

Distribution. Sm.

***Phlaeothrips annulipes* Reuter, 1880**

Fig. 10C, D, F, K

Distribution. Sk, Sm, Ög, Bo, Sö, Up, Vs, Vr, Dr, Vb.

Phlaeothrips bispinosus* Priesner, 1919*Distribution.** Vr.***Phlaeothrips coriaceus* Haliday, 1836**

Fig. 10H, I

Distribution. Sk, Bl, Ha, Sm, Öl, Go, Bo, Sö, Up, Vs, Hs, Vb.***Phlaeothrips denticauda* Priesner, 1914**

Fig. 10J

Distribution. Sk, Vr.***Poecilotriops* Uzel, 1895*****Poecilotriops albopictus* Uzel, 1895**

Fig. 9D

Distribution. Sk, Vr.***Thorybothriops* Priesner, 1924*****Thorybothriops unicolor* (Schille, 1911)**

Fig. 11F

Distribution. Öl, Go.***Xylaplothrips* Priesner, 1928*****Xylaplothrips fuliginosus* (Schille, 1911)**

Fig. 6A

Distribution. Sm, Ha, Sö, Ds, Vr, Dr, Lu, To.**Remark.** First record for Ha and Sö.

Material examined. SWEDEN • 1♂; Halland, Falkenberg kommun, Vessigebro; on *Larix decidua*, 56.9748°N, 12.7288°E, 19 May 2021; E. Wahlberg, leg. • 2♀♀; Södermanland, Nyköping kommun, Skeppsvik; mixed forest; 58.6458°N, 16.8431°E; 03 Jun. 2021; E. Wahlberg, leg. • 1♀; Södermanland, Gnesta kommun, Fridsta; private garden with mixed vegetation; 59.0673°N, 17.1550°E; 14–21 Jun. 2021; E. Wahlberg, leg., window trap. • 1♂ Södermanland, Gnesta kommun, Önnersta; on dead *Betula*; 59.0470°N, 17.1460°E; 16 Jul. 2021; E. Wahlberg, leg.

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References

- Ahlberg O (1926) Tripsar. Thysanoptera. Svensk Insektsfauna 6. Sveriges Entomologiska Förening, Stockholm, 62 pp.
- Boyd Jr BW, Held DW (2006) *Androthrips ramachandrai* (Thysanoptera: Phlaeothripidae): an introduced thrips in the United States. The Florida Entomologist 89(4): 455–458. [https://doi.org/10.1653/0015-4040\(2006\)89\[455:ARTPAI\]2.0.CO;2](https://doi.org/10.1653/0015-4040(2006)89[455:ARTPAI]2.0.CO;2)
- Dubovský M, Fedor P, Kucharczyk H, Masarovič M, Balkovič J (2010) Zgrupowania wciornastków (Thysanoptera) pni drzew w różnowiekowych lasach dębowych Słowacji. Sylwan 154(10): 659–668.
- Gertsson C-A (2015a) Nya intressanta tripsarter från Öland. Lucanus 20: 36–39.
- Gertsson C-A (2015b) An annotated checklist of Thysanoptera (thrips) from the Nordic countries. Entomologisk Tidskrift 136: 185–198.
- Gertsson C-A (2021) Två för Sverige nya tripsarter: *Haplothrips alpicola* Priesner, 1950 och *Haplothrips utae* Klimt, 1970 (Thysanoptera) samt nya provinsfynd. Entomologisk Tidskrift 142: 21–30.
- Gertsson C-A, Fägerström C (2017) Två nya tripsarter (Thysanoptera) för Sverige samt tre nya landskapsfynd från Öland. Entomologisk Tidskrift 138: 131–136.
- Gertsson C-A, Fägerström C, Sjödahl M (2022) Två för Skandinavien nya tripsarter (Thysanoptera): *Hoplothrips caespitis* (Uzel, 1895) och *Megalothrips bonannii* Uzel, 1895 samt nya provinsfynd. Entomologisk Tidskrift 143: 17–24.
- Held DW, Boyd D, Lockley T, Edwards GB (2005) *Gynaikothrips uzeli* (Thysanoptera: Phlaeothripidae) in the southeastern United States: distribution and review of biology. The Florida Entomologist 88(4): 538–540. [https://doi.org/10.1653/0015-4040\(2005\)88\[538:GUTPIT\]2.0.CO;2](https://doi.org/10.1653/0015-4040(2005)88[538:GUTPIT]2.0.CO;2)
- Kąkol E, Kucharczyk H (2004) Occurrence of thrips on the winter and spring wheat in chosen regions of Poland. Acta Phytopathologica et Entomologica Hungarica 39(1–2): 263–269. <https://doi.org/10.1556/APhyt.39.2004.1-3.25>
- Kirk WDJ (1996) Thrips. Naturalists' Handbooks 25. The Richmond Publishing Co. Ltd, Slough, 70 pp.
- Klimt K (1970) Über eine neue, feuchte Standorte bewohnende *Haplothrips*-Art (Thysanoptera) – *Haplothrips utae* spec. nov. Entomologisches Nachrichtenblatt (Vienna, Austria) 13: 121–128.

- Kobro S (2011) Checklist of Nordic Thysanoptera. Norwegian Journal of Entomology 58: 20–26.
- Kobro S (2013) Norske Insekttabeller 19. Trips (Thysanoptera). Norsk Entomologisk Forening, Oslo, 49 pp.
- Kobro S, Rafoss T (2006) Identification of adult males and females of *Hoplothrips* species (Thysanoptera: Tubulifera) known from Norway, and some deductions on their life history. Entomologica Fennica 17(2): 184–192. <https://doi.org/10.33338/ef.84327>
- Kucharczyk H (2004) Thrips (Insecta: Thysanoptera) as an element of ecological monitoring in Białowieża Primeval Forest. Lesne Prace Badawcze 3: 85–94.
- Kucharczyk H, Kucharczyk M (2008) The red list of threatened thrips species of middle-eastern Poland. Acta Phytopathologica et Entomologica Hungarica 43: 297–305. <https://doi.org/10.1556/APhyt.43.2008.2.13>
- Kucharczyk H, Wyrozumski Ł (2015) *Hoplothrips carpathicus* Pelikán, 1961 (Thysanoptera: Phlaeothripidae) – a new thrips species in the Polish fauna. Polish Journal of Entomology 84(2): 73–83. <https://doi.org/10.1515/pjen-2015-0007>
- Kucharczyk H, Zawirska I (1994) Study on the thrips fauna (Insecta: Thysanoptera) on xerothermic grassland of South-East Poland. Sonderdruck aus CFS-Courier 178: 3–7.
- Moritz G (2006) Thripse – Fransenflügler, Thysanoptera. Pflanzensaftsaugende Insekten Bd. 1. Westarp Wissenschaften, Hohenwarsleben, 384 pp.
- Mound LA (1974) The Nesothrips complex of spore-feeding Thysanoptera (Phlaeothripidae: Idolothripinae). Bulletin of the British Museum (Natural History). Entomology 31: 109–188. <https://doi.org/10.5962/bhl.part.29485>
- Mound LA (2004) Thysanoptera – diversity and interactions. Annual Review of Entomology 50(1): 247–269. <https://doi.org/10.1146/annurev.ento.49.061802.123318>
- Mound LA, Palmer JM (1983) The generic and tribal classification of spore-feeding Thysanoptera (Phlaeothripidae: Idolothripinae). Bulletin of the British Museum (Natural History) Entomology 46: 1–174. <https://biostor.org/reference/165>
- Mound LA, Tree DJ (2020) Thysanoptera Australiensis – Thrips of Australia. https://keys.lucidcentral.org/keys/v3/thrips_australia/ [Accessed on 01.iii.2022]
- Mound LA, Morison GD, Pitkin BR, Palmer JM (1976) Thysanoptera. Handbooks for the Identification of British Insects, Vol. I. Part 1. Royal Entomological Society, London, 79 pp.
- Mound LA, Collins DW, Hastings A (2018) Thysanoptera Britannica et Hibernica – Thrips of the British Isles. https://keys.lucidcentral.org/keys/v3/british_thrips/index.html [Accessed on 01.iii.2022]
- Paine TD (1992) Cuban laurel thrips (Thysanoptera: Phlaeothripidae) biology in southern California: seasonal abundance, temperature dependent development, leaf suitability, and predation. Annals of the Entomological Society of America 85(2): 164–172. <https://doi.org/10.1093/aesa/85.2.164>
- Qvick U (1977) New records and notes on the Swedish Thrips fauna (Thysanoptera). Entomologisk Tidskrift 98: 127–131.
- Schliephake G, Klimt K (1979) Thysanoptera, Fransenflügler. In: Senglaub K, Hannemann H-J, Schuhmann H (Eds) established by Dahl, F.: Die Tierwelt Deutschlands und der angrenzenden Meeresteile nach ihren Merkmalen und nach ihrer Lebensweise 66. VEB Fischer, Jena, 1–477.

- Sörensson M (2012) Pilotinventering av den saproxyliska insektsfaunan i Dalby Söderskog 2008. Länsstyrelsen i Skåne, Malmö, 75 pp.
- ThripsWiki (2022) ThripsWiki – providing information on the world's thrips. <https://thrips.info/> [Accessed on 29.iii.2022]
- Vasiliu-Oromulu L, zur Strassen R, Larsson H (2000) New thrips species (Cl. Insecta: Ord. Thysanoptera) for the fauna of Sweden. *Revue roumaine de biologie. Série de Biologie Animale* 45: 125–135.
- Wahlberg E (2019) Revision and morphological analysis of the Ragadidae (Insecta, Diptera). *European Journal of Taxonomy* 521: 1–19. <https://doi.org/10.5852/ejt.2019.521>
- Wahlberg E, Johanson KA (2018) Molecular phylogenetics reveals novel relationships within Empidoidea (Diptera). *Systematic Entomology* 43(4): 619–636. <https://doi.org/10.1111/syen.12297>